

# Investigating Very Low Food Security in the Redwood Coast Region

By Kali Patterson and Jessica Van Arsdale, MD, MPH

The prevalence of very low food security in the Redwood Coast Region is more than 2 times the prevalence in California.

Very low food security is a measure of severe food insecurity resulting in reduced food intake, disrupted eating patterns or hunger.<sup>1</sup> Food insecurity is associated with numerous poor health outcomes including: obesity, diabetes, heart disease, high blood pressure and poor cognitive, academic and psychosocial outcomes.<sup>2-5</sup>

Results from the Rural Health Information Survey, 2006, indicate that there are disparities in very low food security in the Redwood Coast Region.

Respondents with very low food security were significantly more likely to report poor health and depression compared to respondents without very low food security.

Households with incomes below the federal poverty level (FPL)\* are clearly disadvantaged with up to 29% reporting very low food security compared to 1.1% of households at or above 300% FPL.

Respondents with children living in their home were 1.6 times more likely to report very low food security than respondents who did not have children living in their home.

Respondents who were young and non-white were significantly more likely to have very low food security compared to respondents without these attributes.

Up to 25% of respondents from some communities in the Redwood Coast Region reported very low food security.

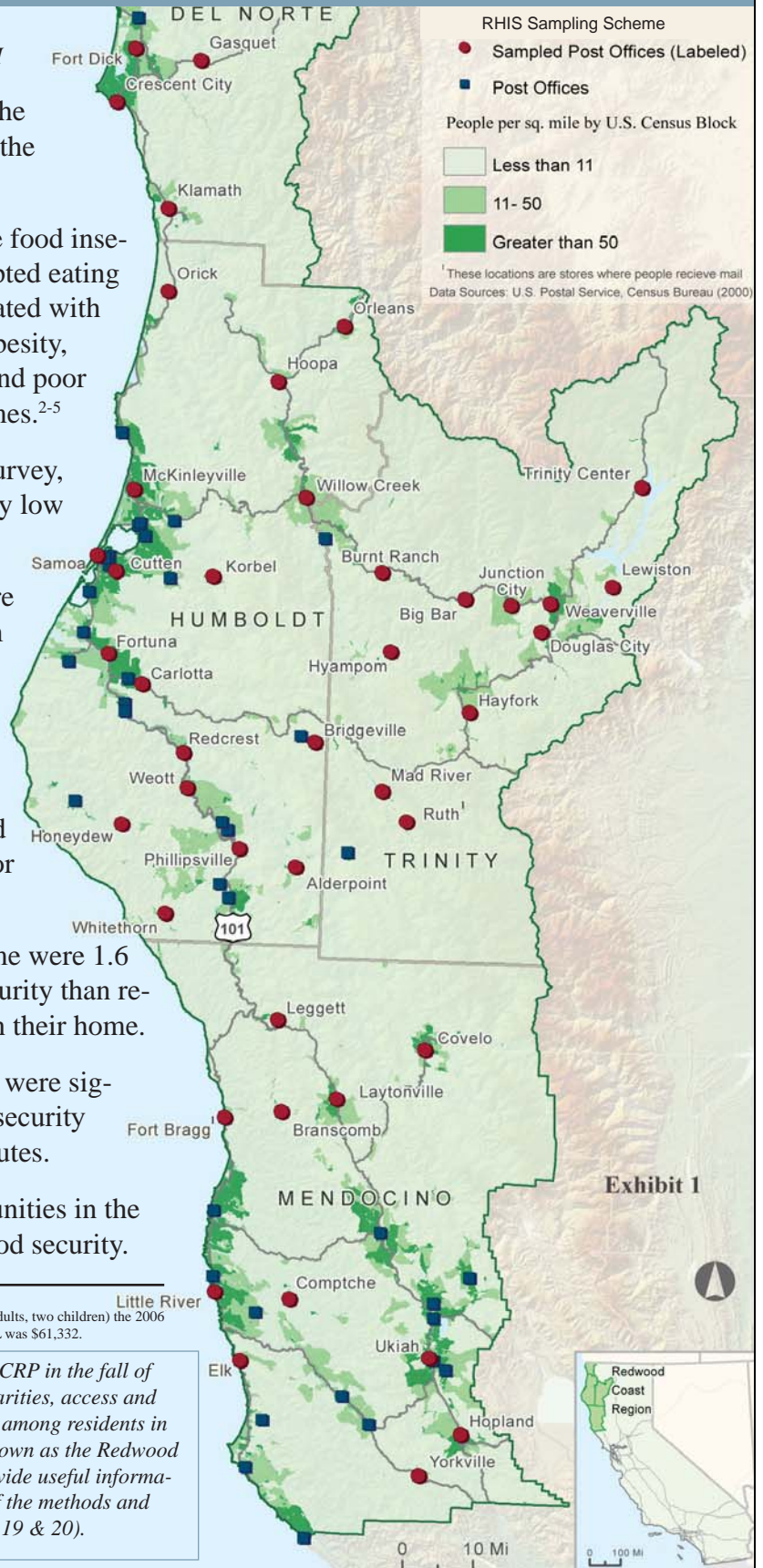


Exhibit 1

\* The Federal Poverty Level (FPL) varies by household size. For a family of four (two adults, two children) the 2006 Federal Poverty Level (100% FPL) was \$20,444, 200% FPL was \$40,888 and 300% FPL was \$61,332.

*The Rural Health Information Survey was conducted by CCRP in the fall of 2006. The purpose of the survey was to assess health disparities, access and utilization of healthcare, and other determinants of health among residents in Del Norte, Humboldt, Trinity and Mendocino counties (known as the Redwood Coast Region - Exhibit 1). The goal of the survey is to provide useful information for planning and policy development. A description of the methods and sample demographics is at the end of this report (Exhibits 19 & 20).*

## What is “Very Low Food Security”?

Food security refers to access by all people at all times to enough food for an active, healthy life. If an individual or household has limited or uncertain access to adequate food they are considered to be food insecure. A household can be further classified as having high food security, marginal food security, low food security or very low food security (Exhibit 2).<sup>1,6</sup>

Very low food security occurs when household members are unable to adequately feed themselves due to economic deficiencies or lack of resources. This results in reduced food intake or disrupted eating patterns. Household members with very low food security may experience hunger because they are unable to afford enough food.<sup>1</sup>

Assessment of food security is a complex process. The USDA’s annual food security survey uses up to 18 different questions to assess food security and this is considered the gold standard for research in the field.<sup>1</sup> The Rural Health Information Survey used one question to assess for a severe level of food insecurity. This brief examines food security status by focusing on responses to the following question: *“In the last 12 months were you or people living in your household ever hungry because you couldn’t afford enough food?”* Respondents who answered “yes” were considered to have very low food security. This type of single question screening measure has been found to be an accurate and reliable way to identify hungry families.<sup>7</sup>

### Exhibit 2: Definitions of Terms

#### Food Security

*High Food Security:* No reported indications of food access problems or limitations.

*Marginal Food Security:* One or more reported indications- typically of anxiety over food sufficiency or shortage of food in the house. Little or no indication of changes in diets or food intake.

#### Food Insecurity

*Low Food Security:* Reports of reduced quality, variety, or desirability of diet. Little or no indication of reduced food intake.

*Very Low Food Security:* Reports of multiple indications of disrupted eating patterns and reduced food intake.

Source: USDA-ERS<sup>6</sup>

### Why Study Food Insecurity? The Link to Health & Obesity

A consistent relationship between food insecurity and poor health status has been demonstrated across a wide range of literature. Numerous studies have shown that individuals living in food insecure households are more likely to report poor physical and mental health than those living in food secure households.<sup>8</sup> Research suggests that food insecurity is related to increased risk for health problems such as obesity, diabetes, heart disease and high blood pressure.<sup>2,3,8</sup>

Research has shown an association between food insecurity and obesity or overweight in adults and children.<sup>2,9</sup> While causal relationships between food insecurity and obesity are difficult to establish, there are several associations that may account for this seemingly paradoxical relationship. Studies have found that food insecurity is associated with lower quality diets, inadequate nutrient intake and reduced consumption of fruits, vegetables, meat and dairy products with increased consumption of cereals, sweets and added fats.<sup>10,11,12</sup> Research indicates that people who have unpredictable availability of food will tend to overeat when food is available and over time this pattern can result in weight gain.<sup>13</sup> When food intake is periodically inadequate the body may undergo physiologic changes making it more efficient at storing calories as fat.<sup>14</sup>

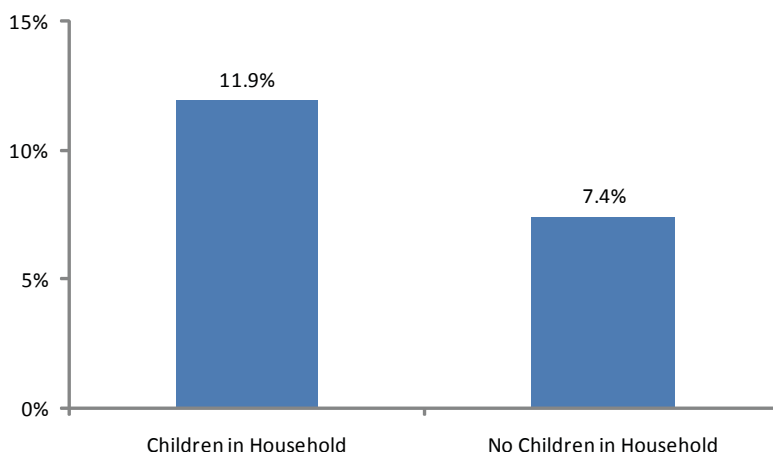
## Very Low Food Security: Households with Children are at Risk

*Respondents with children living in their home were 1.6 times more likely to report very low food security than respondents who did not have children living in their home.*

Of the respondents who live in households with children under 18 years of age, 11.9% reported very low food security compared to 7.4% of respondents who do not have children in their household. Although small, this difference is statistically significant (Exhibits 3 & 4; also see page 7, “What does it mean to be statistically significant?”).

Analysis comparing counties did not show a significant difference between counties with respect to percentage of respondents with children in the household and very low food security.

**Exhibit 3: Very Low Food Security by Households with Children Under 18 (n = 2,902)**



Source: Rural Health Information Survey, 2006, California Center for Rural Policy

**Exhibit 4: Number of Respondents Who Experienced Very Low Food Security by Children in Household**

	Children in Household	Very Low Food Security	
	Frequency	Frequency	%
No	2186	161	7.4
Yes	716	85	11.9
Total	2902	246	8.5

Source: Rural Health Information Survey, 2006, California Center for Rural Policy

### Why Study Food Insecurity? The Link to Children’s Health

Children appear to be particularly vulnerable to the negative effects of food insecurity. Children living in food insecure households tend to have poor cognitive, academic and psychosocial outcomes.<sup>5</sup> Food insecure children are more likely to have “fair or poor” health and are more likely to require hospitalization early in life compared to food-secure children.<sup>15</sup> Infants and toddlers from food-insecure households tend to be more likely to experience developmental risk than those from food-secure households.<sup>16</sup>

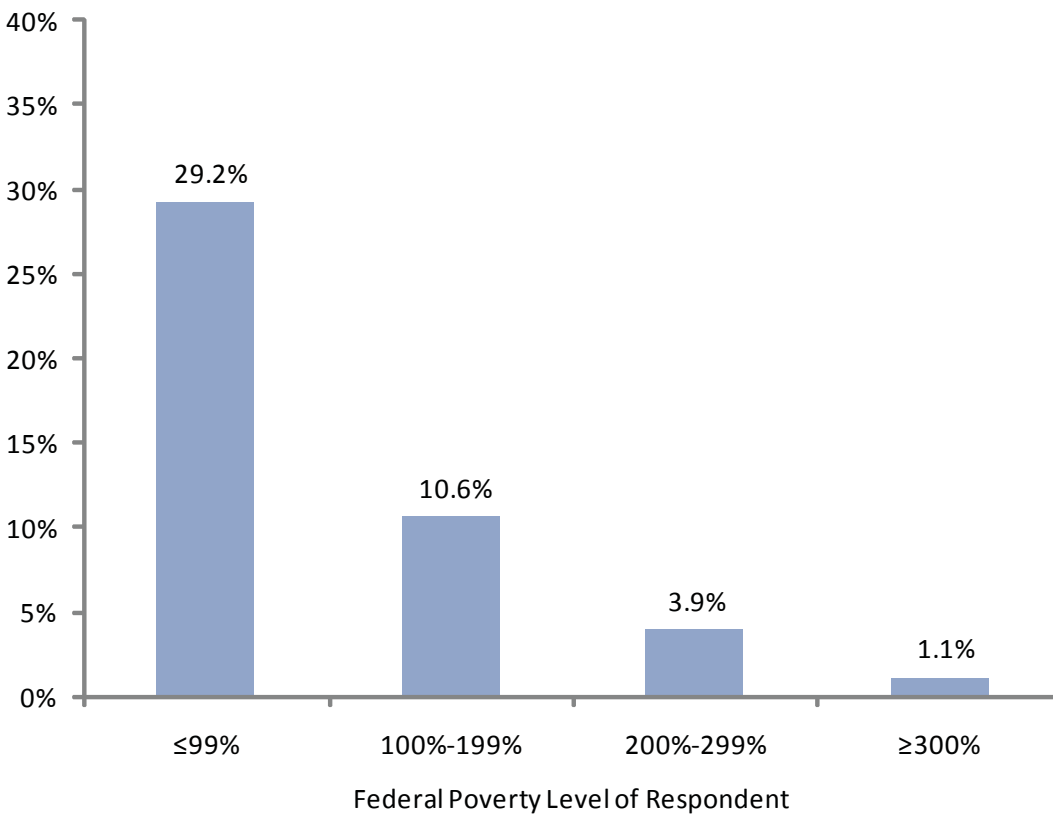
Determining the populations at risk for food insecurity in our communities is important for developing programs and policies aimed at improving health. Assessing and monitoring food insecurity over time can help determine if conditions are improving.

# Very Low Food Security: The Impact of Poverty

*Respondents living in households below 100% poverty were 26.5 times as likely to experience very low food security as those living at or above 300% poverty.*

There was a clear trend in very low food security with respect to poverty. Of the respondents below the federal poverty level, 29.2% reported having very low food security. As the socioeconomic level increased food security improved with only 1.1% of respondents who were at or above 300% FPL reporting very low food security (Exhibit 5 & 6).

**Exhibit 5: Very Low Food Security by Federal Poverty Level of Respondents (n = 2,537)**



\*The lowest % of FPL is the poorest household  
 Source: Rural Health Information Survey, 2006, California Center for Rural Policy

**Exhibit 6: Number of Respondents Who Experienced Very Low Food Security by Federal Poverty Level**

Federal Poverty Level	Very Low Food Security		
	Frequency	Frequency	%
≤99%	407	119	29.2
100%-199%	635	67	10.6
200%-299%	489	19	3.9
≥300%	1006	11	1.1
Total	2537	216	8.5

Source: Rural Health Information Survey, 2006, California Center for Rural Policy

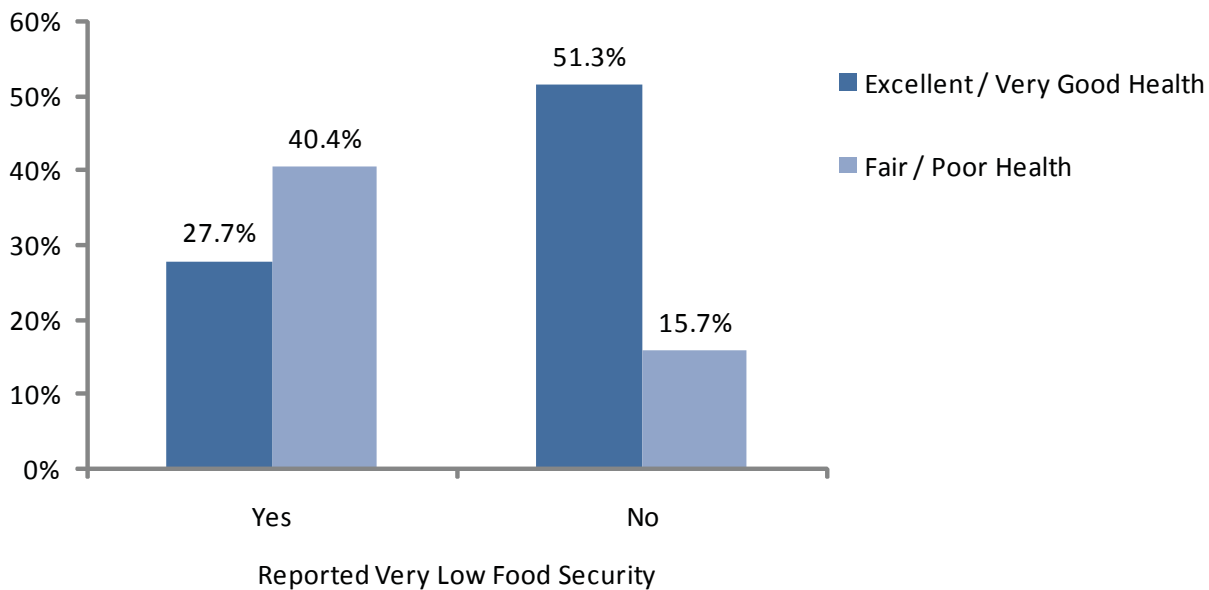
# Very Low Food Security: Impact on Health and Well-being

Respondents with very low food security were 4.5 times more likely to report poor perceptions of general health and 7.8 times more likely to report feeling continuously depressed compared to respondents who did not experience very low food security.

An association was found between very low food security and respondents' perceptions of general health. Of the respondents living in households with very low food security, 40.4% reported poor or fair health compared to only 15.7% of respondents without very low food security (statistically significant differences) (Exhibits 7 & 8).

Significant differences were also found for respondents who reported excellent or very good health. Of the respondents with very low food security, 27.7% reported very good or excellent health. In contrast, respondents without very low food security were significantly more likely to report very good health or excellent health (51.3%) (Exhibits 7 & 8).

**Exhibit 7: Perceptions of General Health by Very Low Food Security (n = 2,881)**



Source: Rural Health Information Survey, 2006, California Center for Rural Policy

**Exhibit 8: Perceptions of General Health and Very Low Food Security**

Reported Very Low Food Security	Perception of General Health					Total
	Excellent	Very Good	Good	Fair	Poor	
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
Yes	17 (6.9)	51 (20.8)	78 (31.8)	57 (23.3)	42 (17.1)	245 (100)
No	360 (13.7)	992 (37.6)	869 (33.0)	315 (11.9)	100 (3.8)	2636 (100)
Total	377 (13.1)	1043 (36.2)	947 (32.9)	372 (12.9)	142 (4.9)	2881 (100)

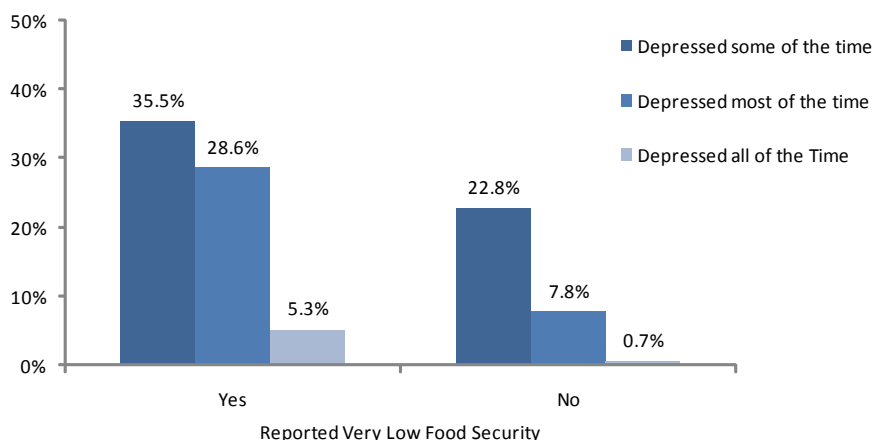
Source: Rural Health Information Survey, 2006, California Center for Rural Policy

## Very Low Food Security: Impact on Health and Well-being *cont.*

Very low food security is also associated with more frequent feelings of sadness or depression. Respondents with very low food security were significantly more likely to report feeling sad or depressed “some,” “most” or “all of the time” than respondents without very low food security.

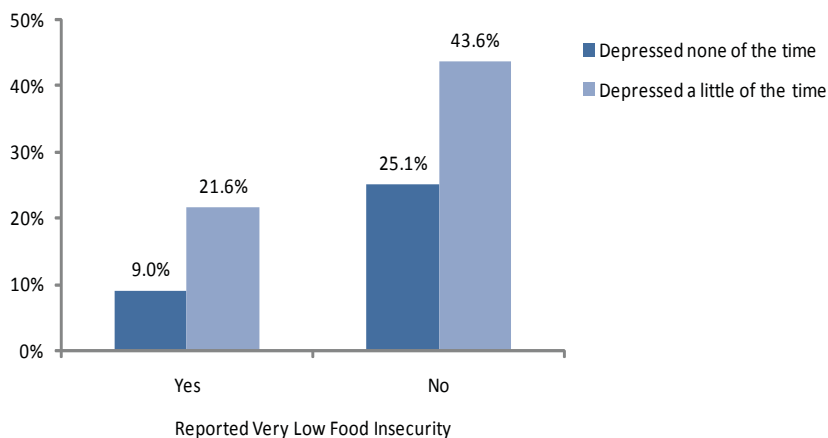
Additionally respondents with very low food security were less likely to report feeling sad or depressed “a little” or “none” of the time compared to respondents without very low food security (Exhibits 9, 10 & 11).

**Exhibit 9:**  
Feeling Sad or Depressed  
“Some,” “Most” or “All” of  
the Time by Very Low Food  
Security (n = 2,877)



Source: Rural Health Information Survey, 2006, California Center for Rural Policy

**Exhibit 10:**  
Feeling Sad or Depressed  
“None” or “A Little” of the  
Time by Very Low Food  
Security (n=2,877)



Source: Rural Health Information Survey, 2006, California Center for Rural Policy

**Exhibit 11: Feeling Sad or Depressed and Very Low Food Security**

Reported Very Low Food Security	Depression					Total
	None of the Time	A little of the time	Some of the time	Most of the time	All of the time	
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
Yes	22 (9.0)	53 (21.6)	87 (35.5)	70 (28.6)	13 (5.3)	245 (100)
No	661 (25.1)	1148 (43.6)	601 (22.8)	204 (7.8)	18 (.7)	2632 (100)
Total	683 (23.7)	1201 (41.7)	688 (23.9)	274 (9.5)	31 (1.1)	2877 (100)

Source: Rural Health Information Survey, 2006, California Center for Rural Policy

## Very Low Food Security: The Impact of Place

*In some communities, up to 25% of respondents have very low food security.*

While there were not significant differences in very low food security between counties (Del Norte 10.1%, Humboldt 9.5%, Trinity 6.6% and Mendocino 8.5%), analysis on a sub-county level revealed drastic differences between communities. Depending on the community, very low food security ranged from 2% to 25%. The GIS maps on pages 8 & 9 show the percent of respondents with very low food security in each sampled community. As would be expected, the census tracts with higher poverty rates tend to have higher percentages of respondents reporting very low food security (Exhibits 12 & 13).

No significant differences in very low food security were found between respondents living in different population densities (<11 people per square mile 7.5%; 11-50 people per square mile 10.7%; >50 people per square mile 7.9%).

### **Food Insecurity: Why Study Place?**

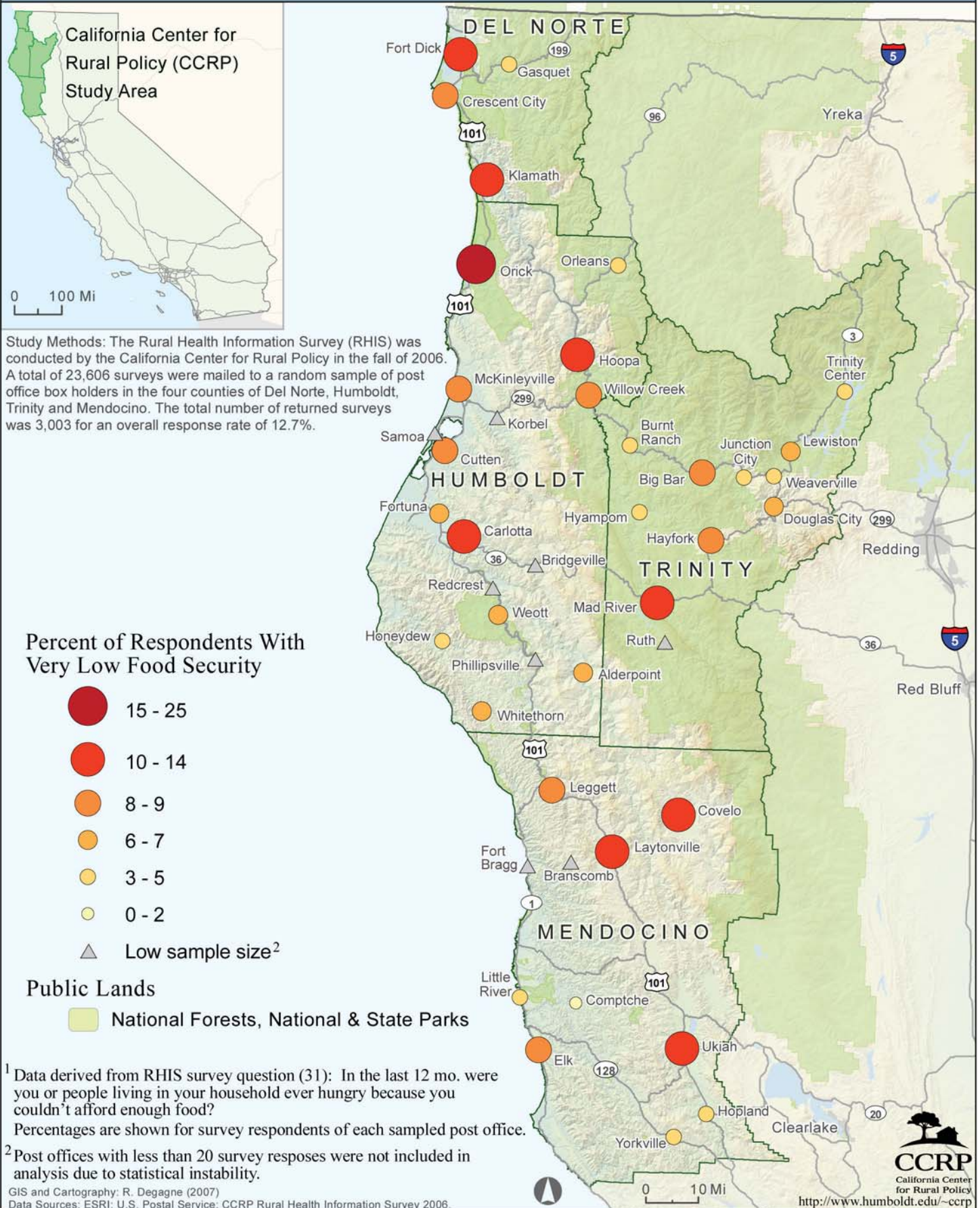
Determining which communities have high levels of food insecurity can help target policies and programs aimed at alleviating food insecurity. Knowing the level of food insecurity for an entire county is useful, but it does not help the county to prioritize the areas with the greatest need.

Monitoring food insecurity in communities over time can help determine if programs and policies are making a difference.

### **What does it mean to be statistically significant?**

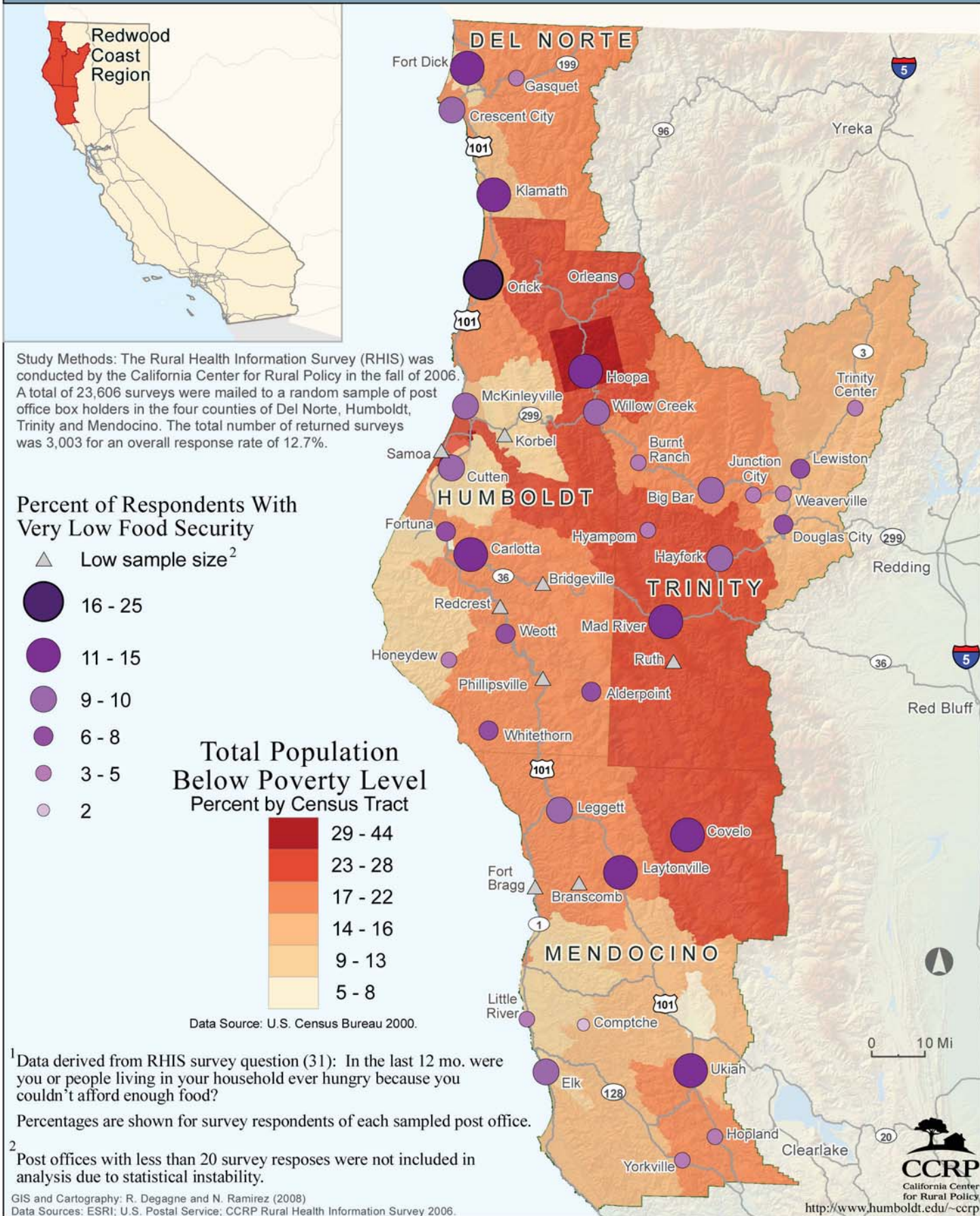
Whenever comparisons are made between groups there is always the possibility of finding a difference simply by chance. In research we like to find “true” differences and not differences that have occurred by chance. By convention, most researchers use a *P*-value of <.05 to determine if a difference is significant. This means there is less than a 5% probability that the difference observed has occurred by chance alone.

# Exhibit 12: CCRP Rural Health Information Survey: Percent of Respondents With Very Low Food Security<sup>1</sup>, 2006





# Exhibit 13: CCRP Rural Health Information Survey: Percent of Respondents With Very Low Food Security<sup>1</sup>, 2006

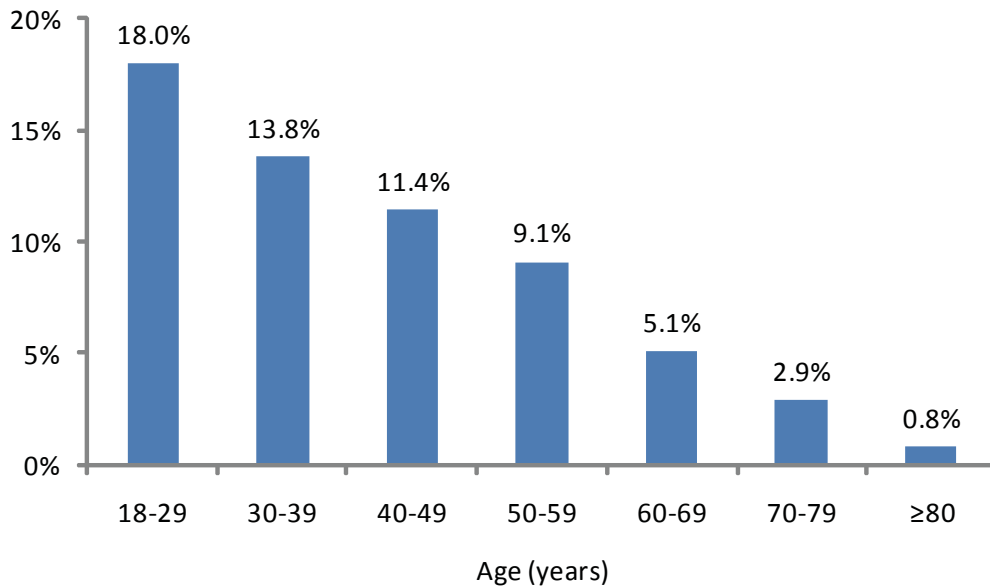


# Very Low Food Security: The Impact of Age

*Respondents below the age of 65 were nearly 3 times as likely to experience very low food security as those who are 65 or older.*

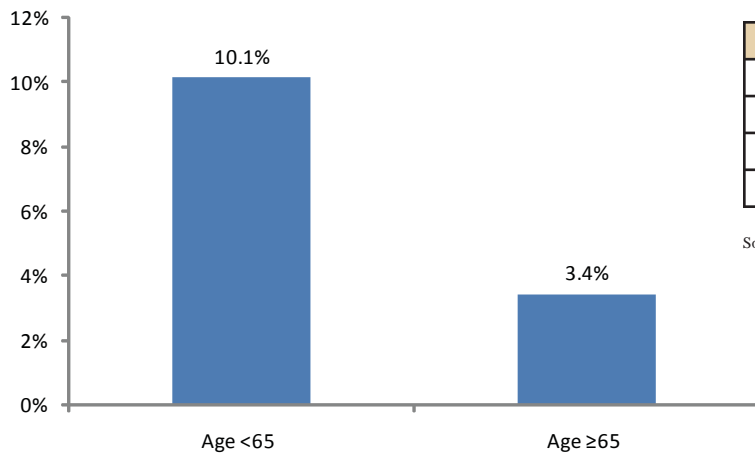
The younger the respondent the more likely they were to experience very low food security. Of the respondents who were 18-29 years old, 18% experienced very low food security compared to 0.8% of respondents who were 80 years or older. There is a linear relationship suggesting that as one gets older the chance of experiencing very low food security decreases (Exhibit 14). Of the respondents who were below 65 years of age, 10.1% reported very low food security, which is significantly higher than the 3.4% of respondents 65 years or older who reported very low food security (Exhibits 15 & 16).

**Exhibit 14: Very Low Food Security by Age (n = 2,858)**



Source: Rural Health Information Survey, 2006, California Center for Rural Policy

**Exhibit 15: Very Low Food Security by Age (<65 or ≥65) (n = 2,858)**



Source: Rural Health Information Survey, 2006, California Center for Rural Policy

**Exhibit 16: Number of Respondents Who Experienced Very Low Food Security by Age**

Age	Very Low Food Security		
	Frequency	Frequency	%
<65	2161	218	10.1
≥65	697	24	3.4
Total	2858	242	8.5

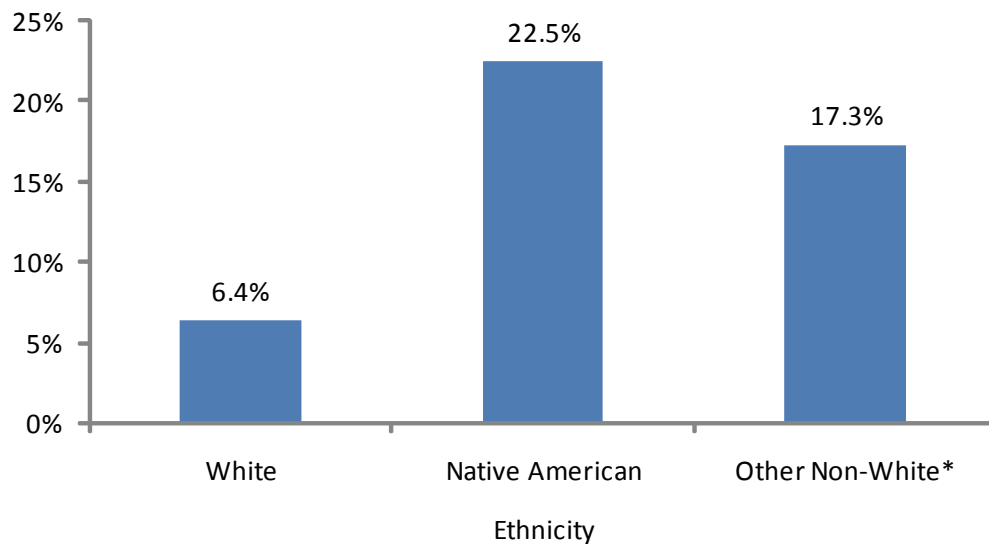
Source: Rural Health Information Survey, 2006, California Center for Rural Policy

## Very Low Food Security: The Impact of Ethnicity

*Non-white respondents were 2.9 times more likely to experience very low food security compared to white respondents.*

Of the Native American respondents, 22.5% reported very low food security. Of the other non-white respondents (includes African American, Latino/a, Asian, Multi-racial and other)\*, 17.3% reported very low food security. There was no significant difference between Native American and other non-white respondents with respect to very low food security, however these groups were significantly more likely to report very low food security compared to white respondents (6.4%) (Exhibits 17 & 18).

**Exhibit 17: Very Low Food Security by Ethnicity (n = 2,887)**



Source: Rural Health Information Survey, 2006, California Center for Rural Policy

\*Respondents were able to classify their ethnicity as White, African American, Latino/a, Asian, Native American, Multi-racial, or Other. Due to a small number of respondents in several of the categories, comparisons were made between White, Native American, and Other Non-White respondents (includes African American, Latino/a, Asian, Multi-racial and other).

**Exhibit 18: Number of Respondents Who Experienced Very Low Food Security by Ethnicity**

Ethnicity	Very Low Food Security		
	Frequency	Frequency	%
White	2438	157	6.4
Native American	142	32	22.5
Other Non-White*	307	53	17.3
Total	2887	242	8.4

Source: Rural Health Information Survey, 2006, California Center for Rural Policy

\*Other Non-White includes African American, Latino, Asian, Multi-racial and "other"

## Discussion

*There are clearly disparities in food security in the Redwood Coast Region.*

Poverty appears to be the main determinant of very low food security. All of the variables found to be associated with very low food security are also associated with poverty. In this sample, there was a significantly higher chance of living below the FPL if the respondents were under the age of 65, non-white ethnicity, with children in the household and living in a low population density area ( $\leq 50$  people per square mile). Of all these variables, the only one that did not show a significant association with very low food security was population density. This suggests the possibility that despite higher poverty rates in lower population density areas people living in these areas are finding means to decrease their chance of experiencing very low food security.

Compared to the nation and California it appears that the Redwood Coast Region has a much higher prevalence of households with very low food security. The 2006 Current Population Survey Food Security Supplement found 4.0% of households in the nation with very low food security.<sup>1</sup> For 2004-06 it is estimated that 3.7% of the households in California had very low food security.<sup>1</sup> This is significantly less than the 8.4% of respondents in the Redwood Coast Region reporting episodes of very low food security.

Households with children in the Redwood Coast Region also have a higher prevalence of very low food security (11.9%) compared to the nation (4.3%).<sup>1</sup> This is concerning given the numerous poor health outcomes associated with low food security.

As the price of food increases, it is likely that the food security situation will worsen, so it will be important for communities to collaborate on both short and long-term solutions.

This research was intended to give a snapshot of the level of very low food security in the Redwood Coast Region. If there is interest from the community, CCRP can collaborate with community partners to seek funding for more in-depth research on this topic.

### Join us online...

Please join us in an on-line discussion about food security in our region.

Contribute to the living document by commenting on the research findings, sharing innovative programs and discussing policy implications. To read comments and post your own, please visit our website, [www.humboldt.edu/~ccrp](http://www.humboldt.edu/~ccrp).

### Join us in the community...

The California Center for Rural Policy will continue to share research results with the community through briefs, reports and meetings.

We plan to engage the community in dialogue about potential solutions and policy recommendations to address identified problem areas.

We hope you will join us as we work together to improve health in our region.

If you would like to receive information from CCRP please contact us to get on our mailing list:

California Center for Rural Policy  
(707) 826-3400  
[ccrp@humboldt.edu](mailto:ccrp@humboldt.edu)

### Join us in collaboration...

CCRP welcomes opportunities to collaborate with community partners for more in-depth research on this topic.



## Methods and Demographics

### Exhibit 19: Methods

The Rural Health Information Survey was conducted by the California Center for Rural Policy in the fall of 2006. The purpose of the survey was to assess health disparities, access and utilization of healthcare, and other determinants of health among residents in rural Northern California with the goal of providing useful information for planning and policy development.

A four-page self-administered survey was developed by project administrators at CCRP. The survey instrument was based on existing surveys (Behavioral Risk Factor Surveillance Survey, California Health Interview Survey, Canadian Community Health Survey and Mendocino Community Health Survey). New questions were developed as needed to inquire about areas of rural health not previously explored, such as access to transportation, phones, computers and Internet as well as skills for responding to emergency medical situations.

A total of 23,606 surveys were mailed to a random sample of adults residing in the four counties of Humboldt, Del Norte, Trinity and Mendocino. The sampling strategy employed the use of a Geographic Information System (GIS) to map the population density for Zip Code Tabulation Areas (ZCTA)<sup>17</sup> with an overlay of the locations of post offices. All of the post offices in low population density areas (<11 people per square mile) were selected (total post offices = 24; total post office boxes = 8165). Post offices located in higher population density areas ( $\geq$ 11 people per square mile) were randomly selected (total post offices = 19; total post office boxes = 15,441) (Exhibit 1).

The total number of returned surveys was 3,003 for an overall response rate of 12.7%. A total of 2,950 surveys provided usable responses for analysis. Responses were analyzed with SPSS version 14.0. Chi Square was used to test for differences between groups with a *P*-value less than .05 considered statistically significant. When multiple comparisons were made adjustments were made to account for alpha inflation.

Sample Demographics are presented in Exhibit 20.

A total of 41.4% of the sample lives in a low-income household (<200% FPL).

### Exhibit 20: Sample Demographics

Characteristics	Frequency	Percent
<b>Federal Poverty Level<sup>18</sup></b>		
$\leq$ 99% Poverty	416	16.2
100%-199%	645	25.2
200%-299%	491	19.2
$\geq$ 300%	1009	39.4
Total	2561	100.0
<b>Ethnicity</b>		
White	2459	84.2
African American	7	0.2
Latino/Latina	34	1.2
Asian	13	0.4
Native American	148	5.1
Multiracial	173	5.9
Other	87	3
Total	2921	100
<b>Gender</b>		
Female	1882	64.1
Male	1053	35.9
Other	2	0.1
Total	2937	100
<b>Age (mean = 55.3)</b>		
18-29	173	6.0
30-39	240	8.3
40-49	455	15.7
50-59	930	32.2
60-69	656	22.7
70-79	310	10.7
$\geq$ 80	126	4.4
Total	2890	100
<b>County of Residence</b>		
Del Norte	421	14.3
Humboldt	880	29.8
Trinity	940	31.9
Mendocino	705	23.9
More than 1 of above	4	0.1
Total	2950	100

Source: Rural Health Information Survey, 2006, California Center for Rural Policy.

**Limitations:** This study provides information about the respondents of the survey and does not necessarily describe the population in general. However, this is the largest study ever conducted in this rural region of California.

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- Poverty Thresholds obtained from U.S. Census Bureau, "Poverty Thresholds 2006" <<http://www.census.gov/hhes/www/poverty/threshld/thresh06.html>> accessed May 2007.

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The California Center for Rural Policy at Humboldt State University is a research center committed to informing policy, building community, and promoting the health and well-being of rural people and environments.

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